

a limp due to the shortening of the left leg by  $\frac{1}{2}$  an inch and he is unable to sit on his haunches owing to limitation in the flexion of the left knee to about  $90^\circ$ . The second disability is the more serious of the two as far as loss of amenity is concerned. The plaintiff will not be able to ride a bicycle or to use the Asian type of lavatory. The physical discomfort of walking with a limp may be overcome by the use of a high heeled shoe. As for the alleged pain which resulted from walking long distances, the surgeon could not account for it but conceded that prolonged walking with a limp may cause a backache.

The plaintiff was in a state of shock when he was admitted to hospital and underwent pain and suffering for some days and the inconvenience and mental distress of lying on his back with his left leg immobilised for 168 days.

The plaintiff's prospective loss of future earnings is one of those imponderables which has to be decided. He is now 59 years of age. According to his counsel, there is no reason barring accidents, why he should not live for another 10 years. The physical disabilities sustained by the plaintiff do not appear to be the reason why he did not resume his business as soon as he recovered from his injuries. The reason was lack of money to meet capital expenditure estimated at \$1,500 but plaintiff qualified that statement by saying that he would have required an assistant to help him. The question of finding the necessary capital would not be a problem if plaintiff recovers damages in this action but the necessity of making allowance for the employment of an assistant would depend upon the extent to which plaintiff is incapacitated from carrying on the business by virtue of his physical disabilities. The main task in his business is supervision over the work of breaking stones at the quarry and delivering them at the work site. It is not exactly the type of work which could be carried out from an arm-chair and would involve a certain measure of physical strain. In a work of this kind, even if the plaintiff is able to work part-time, it may not be possible to engage a part-time assistant. In view of the physical disabilities sustained by the plaintiff, I am of the opinion that the business cannot be efficiently carried on by him without a full-time assistant. I agree with counsel that at least a sum of \$150 would be required each month by way of remuneration for the assistant. Therefore, on the basis of my finding that the plaintiff earned about \$200 a month, the prospective loss of earnings over a period of ten years would be \$18,000. But before finally assessing the amount, I shall have to take into consideration various contingencies. With the additional capital available the plaintiff may be able to expand the business and double or trebble his

income or he may be able to change his business to a more lucrative and less taxing one on his physical capacity. On the other hand, his business might fail or his remaining life span may be much shorter than ten years. Taking all these factors into consideration, I will assess the loss of prospective earnings at \$12,600 and damages for pain and suffering at \$5,000.

There will therefore be judgment for the plaintiff for \$26,916 and costs against the 1st and 2nd defendants. The claim against the 3rd and 4th defendants is dismissed with costs and there will be a further order that the costs payable by the plaintiff to the 3rd and 4th defendants be taxed and recovered from the 1st and 2nd defendants.

*Judgment for the plaintiff.*

Solicitors: Yeap & Yeap; Richard Talalla & Menon; Peh Swee Chin.

## HOON WEE THIM v. PACIFIC TIN CONSOLIDATED CORPORATION

[O.C.J. (Gill J.) May 28, 1966]

[Singapore — Civil Suit No. 1053 of 1964]

*Tort — Non-Natural use of land — Danger to others — Absolute liability — Rule in Rylands v. Fletcher.*

*Damages — Personal injuries — Recovery under doctrine of Rylands v. Fletcher — Interest on damages.*

*Mining — Reservoir above ground level — Collapse of bund — Escape of water — Liability.*

The defendants had built a water reservoir above ground level on their land. The reservoir contained very large quantities of water. There was heavy rainfall in the surrounding hills on October 7 and 8, 1963 and seepage conditions appeared on the water bund of the reservoir. The bund started to fail and finally collapsed. As a result water escaped on to the adjacent land and this caused the death of one Hoon Thye Peng by drowning. The administrator of his estate claimed damages arising out of the death.

Held: (1) this case comes within the rule in *Rylands v. Fletcher* (1) and the defendants were liable in damages;

(2) damages for personal injuries can be recovered under the doctrine of *Rylands v. Fletcher* and therefore the plaintiffs were entitled to recover damages for the death of the deceased in this case.

Cases referred to:—

- (1) *Rylands v. Fletcher* (1868), L.R. 3 H.L. 330.
- (2) *Attorney-General v. P. Y. A. Quarries Ltd.* [1957] 2 W.L.R. 786.
- (3) *Smith v. Kenrick* (1849), 7 C.B. 515.
- (4) *Baird v. Williamson* (1863), 15 C.B. (N.S.) 376.
- (5) *Rickards v. Lothian* [1913] A.C. 263, 280.
- (6) *Read v. Lyons & Co. Ltd.* [1947] A.C. 156, 176.
- (7) *Tennent v. Earl of Glasgow* (1864), 2 M. (H.L.) 22.

- (8) *Greenock Corp. v. Caledonian Railway* [1917] A.C. 556 at p. 577.  
 (9) *Nichols v. Marsland* (1875), 2 Ex. D. 1.  
 (10) *Miles v. Forest Rock Granite Co. Ltd.* (1918), 34 T.L.R. 500.  
 (11) *Shiffman v. Order of St. John* [1936] 1 All E.R. 557.  
 (12) *Hale v. Jennings Brothers* [1938] 1 All E.R. 579.

## CIVIL SUIT.

*Denis Murphy* (T. G. Dunbar with him) for the plaintiff.

*P. Mooney* (T. Lee with him) for the defendants.

*Cur. Adv. Vult.*

Gill J.: This is an action by the plaintiff as administrator for damages arising out of the death by drowning of one Hoon Thye Peng alias Hon Pai Peng alias Chon Thye Peng in consequence of the escape of water in a flood condition from the defendants' mine. Hoon Thye Peng deceased was at all material times the owner and occupier of a farm and farmhouse at the 3rd mile, Cheras Road, Kuala Lumpur adjacent to the defendants' mining lands.

The defendants carried on dredge mining on their lands on which at all material times they maintained ponds or reservoirs of water which were separated from each other by bunds known as intermediate bunds with one bund all round the general area of the mine known as the perimeter bund. There were spillways over the bunds to allow the flow of water from one area into another and for the final run-off into a river. All these are shown in the plans which have been put in evidence.

The ponds material for the purpose of this case have been described as P.1 and P.2 and the bund separating them as bund A or bund P.1/P.2. The material spillways were spillways 13, 17 and 6. Spillway 13 was on bund A and spillway 17 on the outer bund of P.2. Spillway 6 was on a bund which separated P.1 from a pond into which the Sungei Puteh Tin Mine pumped their slimes. It was the effluent from this pond which flowed into P.1 over spillway 6, there being no direct deposit of the slimes from the Sungei Puteh Tin Mine into P.1.

It is common ground that the flood which caused the damage in this case arose by reason of the collapse of bund A or P.1/P.2 bund. It is not in dispute that at the time of the accident there was a large quantity of water in P.1 so as to cause a flood condition when it escaped in consequence of a very large breach in bund A. There is also no dispute that the escape of water was likely to cause damage. In this connection A.S.P. Tsia Keng Nam of Cheras Police Station, who went to the scene of the flood soon after its

occurrence, has given evidence to say that when he put the flood rescue operation in motion he saw livestock and human beings being washed away. According to him, most of the wooden houses, which were not strong enough to withstand the impact of the flood, were also washed away.

It is in evidence that before April 1960 the defendants' dredge was to the west of bund A in the area shown as P.2 on the plans. It went through that bund into the area of P.1 during that month. The breach made by it in the course of its passage through bund A was built up to the usual level of the bund after it had entered the P.1 area. About June 1962 the dredge came out of P.1 through the same bund and after its passage into P.2 the bund was built up again. After that it continued in a south-westerly direction until January to March, 1963. It turned to the north in April to June, 1963 and crossed the railway line. The dredge paddock after that period is shown in the plan submitted with the renewal of the application for the water licence in August 1963.

The rebuilding of bund A after the dredge-crossing was completed in November 1962. It was essentially a sand bund resting on a mat which was built by depositing lumps of rock, clay, sand and slimes on bed-rock and pumping sand into water on top of such deposits. It was designed for the retention in P.1 of slimes and water up to a height of about 12 feet from the base. It was larger than an ordinary bund because it was intended to be the permanent bank of a proposed deviation of Sungei Kerayong and Sungei Puteh.

P.1 was at one time used as a slimes or tailings area, but there is some evidence that the pumping of slimes into that area stopped in May 1962. In any event there was no direct deposit of slimes into P.1 on the completion of bund A after the dredge had moved into P.2. The water level in P.1 was raised gradually over a period of several months. Being a big area, it took a long time to fill up. In March 1963 the water was up to the foot of the bund. In April 1963 it was a little higher. Thereafter the water level was allowed to rise naturally. As the water in P.1 was building up, some of it was being used all the time over spillway 13 to supply the dredge in area P.2.

After the dredge had crossed the railway line, it stopped taking water from P.2. Thereafter water from P.1 was being taken directly to the dredge paddock through a pipeline by gravitation. A second pipeline was being installed in order to take more water into the dredge paddock, and the head of water in P.1 was being raised to meet this requirement. Thus at the time of the accident P.1 was essentially a water reservoir

for the purpose of supplying water to the dredge paddock. The difference in water level between P.1 and P.2 on the date of the accident was 5 or 6 feet. About 10 days before that the difference in the water levels over a period of 2 months had been somewhere between 9 and 12 feet. The level of water in P.1 before the breach was 9 feet below the top of the bund and about 13 feet above the sand mat.

The events which led to the collapse of bund A may be said to have commenced on 7th October, 1963 when there was heavy rainfall in the hills surrounding the defendants' property, followed by more rainfall on 8th October, 1963. All this rainfall caused considerable damage in the area of the gravel pump mine of the defendants on the upper reaches of Sungei Puteh. The banks and the bed of the river were scoured over a width of about 50 to 60 feet and over a length of 180 feet alongside the gravel pump mine near a gabion weir. The gabion weir was torn out by the root and some bridges further down were washed away. The level of the water had risen by about 4 feet but by the morning of 9th October it had gone down to its normal level.

On 8th October, 1963 at about 4 or 5 p.m. the bund near spillway 17 was reported to be leaking. Mr. MacLean, the defendants' mines superintendent, visited the bund and saw a big damp patch on the side of the bund with water trickling down and carrying grains of sand. However, the situation on that bund did not appear to him to be dangerous, although the water level in P.2 was too high. He therefore gave instructions for one 12-inch board to be removed from spillway 17 and for the posting of a watchman who was to call him if there was anything unusual. He also had a look at spillway 13 and examined bund A near the spillway to check the flow of water from the area behind. There was nothing wrong with bund A at that time and the water level in P.1 had not risen noticeably because of the rain on 7th October.

On 9th October, 1963 at about 9.30 a.m. Mr. MacLean's assistant, Mr. Mayne, went to inspect the bund on which there had been leakage on the night before. He saw 4 or 5 leaks on the bund on the Cheras Road side. There was sand moving away from the bund. The water in P.2 at that time was about 1½ feet from the top of the bund and the leaks were at the same level as the water. He considered the position as unusual because the water was higher than he had ever seen before and the bund was leaking. It was a situation which had never happened before. He therefore gave instructions for the removal of a plank from spillway 17.

Standing at the bund of spillway 17, Mr. Mayne noticed that there had been a slip of sand on P.2 side of bund A. On going up to that bund

A he saw that the slip of sand had reduced the width on the top of the bund by 2 feet along a length of 20 feet giving it a saucer-like appearance. He thought that the ripples of water on P.2 side of the bund had undercut the bund. He had seen something like this happen before, but there had not been so big a slip. The situation did not alarm him, but he realised that it required immediate attention. He gave instructions for the two bulldozers which were standing by to take sand to the bund and fill up the area where the bund had slipped.

Having set the repair work in motion on being satisfied that it appeared to be going on satisfactorily, he went to the dredge, arriving there at about 10.30 a.m. While at the dredge, as he was having a conversation with the dredge master in the winch room, he looked across in the direction of bund A and saw that there had been further slipping. He therefore returned to the bund, arriving there at 11 a.m. There was another slip just as he arrived there. Then he saw a boiling of water about 6 feet from the edge of the bund about 12 inches in diameter and rising about 6 inches above the water level. He did not think that the boiling had anything to do with the slipping of the sand, but he was sure that the bund was going to collapse at any moment. He therefore went along to spillway 17 bund and, with the aid of the workmen there, made a breach in that bund in order to allow the water from P.1 and P.2 to flow into and be contained in the area bounded by the north perimeter bund.

Having done that, he went to the perimeter bund to see that the spillway there was not blocked. From there he noticed that the sliding at bund A was very violent and that the bund would collapse within a few minutes. He therefore instructed the watchman to warn the people living on the banks of Sungei Kerayong that there would possibly be a flood. He then drove round to the Cheras end of Sungei Kerayong via Kampong Pandan and Circular Road as it was not possible at that time to drive along the perimeter bund in order to get there by the shortest route. By the time he got to Cheras Road, Sungei Kerayong had already overflowed its banks and there was about two feet of water in the houses on the banks of the river. He telephoned his office to inform them what had happened and then reported the matter to A.S.P. Tsia Keng Nam at Cheras Police Station.

Mr. Tan Wee Kiat, the Inspector of Mines, Kuala Lumpur North, on hearing about the flood, went to the area at about 2 p.m. together with Mr. Curtis, the Senior Inspector of Mines. Both of them went along the bunds to try and locate the initial breach until they came to a breach which was 300 feet wide. Mr. Tan Wee Kiat

went to the site again at about 7.45 a.m. on 10th October, 1963 and saw the breach at bund A. He inspected the bund which, according to him, was made of loose and unconsolidated sandy material, and it was unvegetated in the vicinity of the breach. He had some photographs taken which are in evidence. His other evidence is that as mines inspector he was then looking after two mining areas with about 100 mines. Some of the mines had reservoirs in old mining holes below ground level, but he could not recall any other mines having reservoirs above ground level. He thought that the defendants had the reservoir above ground level in order to save the cost of power for pumping water to the dredge paddock, as from the reservoir water got into the paddock by gravity through a pipeline. He stated further that he had never known a bund of similar material being used to retain water. In most cases a bund was used for retaining the slimes area, and the mines department did not authorize structures for the retention of water.

Mr. Tan went on to say under cross-examination that at the time of the accident there were several million tons of slime in the area marked P.1. A discharge from Sungei Puteh Tin Mining Ltd. was coming into P.1 through spillway No. 6. Up to the collapse of the bunds he had no complaints about the bunds themselves or the retention area. His last visit to the mine before the collapse of the bunds was on 26th August, 1963 when he saw nothing unusual about the area. He agreed that the mining scheme adopted by the defendants was the one of which he had recommended approval. He also agreed that if water was taken out of the reservoir and the river still allowed to flow into the slimes there would be erosion, but he was unable to say whether the amount of water in P.1 at the time of the accident was consistent with its use as a slimes area. He added that there was nothing wrong in saving the cost of power by storing water above ground level provided it was safe to do so.

Mr. Curtis, the Senior Inspector of Mines, has given evidence to say that shortly after the flood he went to the mine. He saw the bund which had been breached. He saw no slimes deposited on the upstream slopes of the bund. It was not usual in tin mines in Malaya to have pools like P.1 for retaining water except for mine holes below ground level. Slimes areas, according to him, would have approximately 1 foot of water overlying the slimes in banded areas. It was common practice to have sand bunds for enclosing slimes areas, but apart from the bund built by the defendants he could recall only one other sand bund which was used to retain a large quantity of water. He came to know of that bund because it burst and he was called to make a preliminary investigation of the accident.

A The defendants called in Messrs. Vallentine & Dunne, a firm of consultant mining engineers, to investigate the nature and cause of the collapse of the bund. Mr. Waugh, who is a member of this firm, visited the area of the breach on 10th October, 1963 with Mr. Fletcher of the same firm. He observed no immediate indications to account for the collapse of the bund, but he fell into a quicksand approximately 30 feet out from the south end of the breach just on the upstream side. On 11th October, 1963 he examined the foothills in the Cheras area for signs of any breaching of the old mining pools which might have caused the overtopping and breaching of the perimeter bund and subsequent collapse of the intermediate bunds by drawdown, and his colleague Mr. Fletcher flew over the area that afternoon. On 12th October, 1963 he was satisfied that there had been no breach in the Cheras hill pools and that the original breach had occurred at bund A. On 14th October, 1963 he carried out a survey of the breached bund. Water levels were taken in P.1 and P.2 from distinctive water marks on the side slopes of the bund and some photographs were also taken.

E Mr. Waugh has given evidence about the topographical situation of the defendants' lands which, he says, are situate in a steeply inclined valley running over a length of approximately  $2\frac{1}{4}$  miles from Ampang to Ulu Pudu, the drop in the ground level over the valley being 60 feet. The other peculiarity about the defendants' mine is that it is contained in a large catchment area of 10 square miles and two rivers of large and variable run-off flow through it. The mining and slimes retention areas are in the valley, so that the defendants in planning their mining scheme have to design their paddock and retention areas in such a way that they can cope with large and variable run-off from the catchment area and from the two rivers running through their property. The apparent solution to the problem was to construct a series of step ponds to control the slimes and provide water cushions to prevent ground erosion by the water entering each pond over the spillways. It was necessary to carry the water above ground level because there is a drop of 60 feet between the top and the bottom of the valley. As the ponds were also used as slimes retention areas, it was necessary for that water to be above ground level for the same reason.

I Having concluded his initial investigations and found nothing wrong with the bund, Mr. Waugh recommended that Mr. Vail of Binnie & Partners, whom he knew to be a competent dam consultant, be called in as a specialist to examine the bund. He also decided to carry out a sub-surface investigation of the breach at bund A. He had facts relating to the quicksand which was

present 24 hours after the flooding, suggesting the cause of the breach. The other facts he had suggesting the cause of the breach were the heavy rainfall prior to the breach, the fact that the bund was substantial and the fact that the bund had stood for approximately a year without any outward signs of collapse. Sliding was observed only on the downstream side of the bund. The boiling in the water was a significant feature. He could not see how piping through the sand mat was possible. A 5-foot differential of head could not cause piping through 84 feet of cohesionless sand and 6 feet of water. Quick-sand brought the possibility of springs to his mind. He therefore asked Mr. Daniell of the defendant company to sink tube wells in the area.

The evidence of Mr. Daniell was taken on commission in London. A major portion of his evidence deals with the general situation of the land and the levels of the various areas in the mine. The material portion of his evidence, however, is with regard to the sinking of tube wells some of which produced an artesian flow. However, he found no artesian flow on the site of the breach.

So far I have dealt with such facts of the case as cannot be said to be very much in dispute. The rest of the evidence, apart from the evidence relating to the damages suffered by the deceased's estate, is in the nature of expert evidence as to the probable cause of the failure of the dam. The plaintiff has called Dr. Thambu Mylvaganam, a specialist in soil mechanics who has been seconded to this country by the United Nations to work in the Drainage & Irrigation Department Research Station on the designing of earth dams. I propose, however, to deal with his evidence at a later stage.

After Mr. Vail had been engaged by the defendants as a specialist, Mr. B.K. Ng of Vallentine & Dunne did a number of *in situ* density tests and *in situ* moisture tests with material obtained from three pits on the bund and 4 pits on the sand mat as positioned by Mr. Vail. He also did 8 compaction tests and took a total of 13 grading analyses. He supplied all these results to Mr. Vail. He took a bulk sample each from the bund and the sand mat, which were marked A and C respectively and despatched to London for certain tests to be carried out by Professor Bishop.

The substance of the evidence of Professor Bishop, which was taken on commission in London, is as follows. He carried out, or had carried out, in his laboratory certain tests specified by Binnie & Partners. He was not seeking to interpret those tests or expressing any particular opinion on their significance or whether they were an adequate survey of the soil pro-

A perties on the site. His view was that the test data which he was providing by itself would not indicate the cause of the disaster which had taken place. He felt that in a case of this sort an examination of the bund itself and of the mat on which it stood would not necessarily provide the solution to the failure of the bund. He expressed the opinion that a detailed knowledge of the geology and topography of the site would be necessary to express a clear opinion on the cause of the failure of the bund. In his opinion water pressure, particularly in periods of heavy rainfall, whose origin is a source some distance from the site can act in an artesian form causing uplift pressures beneath a bank or bund, possibly even failures.

Professor Bishop was cross-examined at great length, but as he has not expressed any clear cut opinions on the matter in that part of his evidence, I do not consider it necessary to deal with it in detail. A good deal of his evidence deals with the question of the right quantity of samples for testing and whether such samples should be disturbed or undisturbed samples. He has not said very much about permeability of materials generally, but he has stated that it is now the increasing practice, particularly in the Scandinavian countries, to use glacial moraine, which is little more than dirty sand or gravel, in the cores of dams in which a more permeable material is used for the shoulders of the dam. He has stated further that, if water to be stored is not to be for use as a valuable commodity, you can use relatively permeable materials either for the core of the dam or the whole of the structure.

I now come to the expert evidence of Mr. Vail, a specialist in soil mechanics who has been associated with the design of several major earth dams in various countries.

Mr. Vail first went to the mine on 16th October, 1963 and visited the site on many occasions thereafter. He saw the bund and the sand mat. He was supplied with the results of the tests carried out by Mr. Ng. He had these results sent to Professor Bishop and later obtained from Professor Bishop the results of tests carried out by him. He has put up a report with regard to the investigations carried out and the conclusions at which he arrived as regards the cause of failure of bund A. This has been put in evidence.

The substance of Mr. Vail's testimony at the trial is that the evidence strongly suggested that the cause of failure was piping or internal erosion, which could have occurred (1) through the bund, (2) through the mat beneath the bund or (3) through the mat through some other source of pressure than the water in P.1. His first thought was that the bund had failed by internal

erosion from P.1 to P.2. He thought so because of the evidence of boil and because seepage is the first thought that comes to one's mind when considering the failure of a sand bund. However, from his investigations and calculations he was satisfied that the bund was stable and there was nothing wrong with the sand mat, so that piping through the mat from some source of pressure other than pool P.1 was considered a possible cause of the collapse of the bund.

Mr. Vail's opinion about the bund is that it was made of well graded sand. Near the top of the bund compaction exceeded Proctor, it being 110%. Lower down it was 99%. The *in situ* density was 90% of the Proctor maximum dry density which was very good compaction for any material. The results of the flow nets which he drew on the basis of conditions prevailing at the time of the accident gave him factors of safety and provided an indication of stability against excessive seepage. Permeability of the sand in the bund was 10-5.

As regards the sand mat, he says that it had a very much lower density of 88% because it was placed hydraulically through water and not mechanically compacted. Compaction factor, however, was less important for the mat because it had wide slopes of 1 in 20 and because the width of the bund on top of it was about 80 feet. The mat did not have to be so strong as the bund because it was so wide and massive, although the lower compaction figure of the sand mat would have had an effect on the permeability which was 100 times more than the permeability of the bund. Water could pass much more quickly through the mat than through the bund, but the fact that the head on the mat was too small would prevent piping through it. This is because the factor of safety of a dam depends upon the ratio of the hydraulic gradient to the critical gradient which is the gradient at which particles are lifted from the downstream face. In making his calculations he assumed that horizontal permeability was three times the vertical permeability. These calculations showed that water travelling through the mat could not have caused the failure.

As regards slipping, what Mr. Vail has said is that excessive seepage under certain conditions can cause progressive surface slipping. This happens when the hydraulic gradient approaches the critical gradient. When that happens, you get small slips because the slope then assumes a more stable angle. In this case, however, the bund did not fail by reason of progressive surface slipping because the boiling of water was not consistent with such failure. The effect of excessive seepage is stated by him to be as follows:

"If there is excessive seepage in a bund leading to the piping stage, there is a violent settlement of the bund. The bund sinks down. The final failure normally occurs by overtopping after the subsidence. If the boiling which

A Mr. Mayne saw was caused by piping through the bund, there would have been a simultaneous settling down of the bund. In the last stages it would have been violent. .... It is only when seepage pressure becomes excessive that internal erosion begins. Once internal erosion begins, collapse is inevitable unless immediate action is taken."

B With regard to the evidence that over a certain period about ten days before the accident the differential of water in P.1 and P.2 was between 9 and 12 feet, Mr. Vail has stated that that condition would have imposed a greater strain on the bund and the mat and the seepage conditions would have been much more severe.  
C If the bund withstood that condition, then on the differential becoming smaller there was lesser danger of piping. In his opinion it was not possible that the greater differential led to the collapse of the bund ten days later. Had the more severe conditions existed for one day only, there might have been this possibility, but the greater differential had been there for a longer period. If the differential of 10 feet was sufficient to cause the collapse, such collapse would have taken place much earlier. The process of piping could have started at the stage when the head of water was 9½ feet. If it had, the bund would have collapsed at that time because piping can be gradual in cohesive soils but not in well graded sand. The bund and the mat in this case were of sufficient width to prevent excessive seepage. There would have been some kind of disturbance if there had been piping from P.1 to P.2. The structure would have slumped down at the time of the boil. The boil in the downstream would have had corresponding vortex on the upstream. The boiling represented the final stage of the collapse.  
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It will be convenient at this stage to deal with the evidence of Dr. Mylvaganam, the other specialist in soil mechanics. The substance of his evidence is as follows. Sand is pervious. Any structure founded on a pervious material is bound to fail because the water will seep through and in due course wash away the material itself. If the level of the water remains constant up to a certain height, there is less danger of the mat being washed away. If the height of the water increases, velocity increases. The only way to avoid washing away is to build a foundation of less pervious material. If he were designing a bund using sand material on either side, he would have a foundation to a depth of one-third the height of the bund of some relatively impervious material. That would be to prevent the foundation from being washed away and to provide stability. Every material can be said to be pervious in the sense that some water will pass through, but in the case of sand it will pass through very quickly.  
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His opinion about the samples sent to Professor Bishop is as follows:

"It (Sample A) does not contain any fine material which can be described as silt or clay for the purpose of binding or compacting. Sample C of which the sand mat is said to have been made is almost the same as Sample A except that it has no gravel. It has no fine binding or compacting material. Sample A and Sample C are very poor construction materials. The sand mat as part of the dam was not all right because it could not be compacted properly and was therefore pervious. One cannot be satisfied with a dam constructed of that material. As the pressure on it increases, it will fail eventually. In this case both the sand mat and the bund were unsatisfactory.... Permeability of Sample A is shown as  $10^{-4}$  and of Sample C  $10^{-2}$ . Permeability of  $10^{-2}$  indicates good drainage, which is the opposite of what was required here. Permeability of  $10^{-4}$  is on the border line of good and poor drainage, which again is the opposite of what was required here."

The witness went on to say that a well-graded material will have clay, silt, sand and gravel — a bit of everything. Samples A and C used by Professor Bishop could be considered well-graded sand. In his opinion sand is not a suitable material for the core of a dam. He had seen a photograph attached to the evidence of Mr. Daniell. This indicated that a certain amount of water was retained in the bund before or during the collapse. The photograph showed that the bund was saturated. After all the water from upstream had drained out, the water from the saturated bund came out and caused the holes and erosions shown in the photograph. At the end of his examination-in-chief he said,

"Sand cannot be compacted. It can be compacted to a very small degree if it is wet. Compacting of sand will not prevent water going through. Lowering of the water level on the downstream side will increase the effective head on the upstream side, causing more pressure on the bund. It would increase the rate of flow through the bund. It will reduce the stability of the bund."

Dr. Mylvaganam stuck to his opinions under cross-examination. This is what he said on the cause of failure of the bund:

"My feeling about the bund is that it was permeable. Permeable bunds are bound to fail in due course. There will be seepage which will tend to increase as the years go by and it will wash off the finer sand. As the velocity of the seepage water increases still further, it will carry particles of a greater diameter and eventually the bund will fail.... Seepage by itself will not cause failure unless it is excessive. When the hydraulic gradient exceeds a certain value in a given material of a given grading in a given structure, then stability is in danger.... If there is excessive seepage, the bund will fail. If the seepage is such that it does not carry particles away, the bund will not fail.... Any dam built completely of sand will fail within a few days or a few months if it is subjected to excessive pressure and excessive seepage. If it is not subjected to excessive pressure, it will not fail.... Seepage becomes excessive when it is able to move the particles so as to create piping or internal erosion. One must determine the velocity of the seepage. Hydraulic gradient will determine velocity of the seepage. Hydraulic gradient will determine the velocity up to a limit, but Darcy's Law does not apply to turbulent flow. Even after piping has developed, the bund may stand for some time. I agree that Darcy's Law is valid for seepage through dams."

A The witness concluded his evidence by saying that in his experience he had never come across a bund made entirely of sand.

The substantial defence in this case is that the breach of bund A was caused by a solution spring or springs in the limestone bedrock beneath the sand mat of the bund. Expert evidence on this has been given by two eminent geologists, Dr. Garnett and Dr. Fitch. Their evidence proceeds on the basis that there was a limestone bedrock under the defendants' mining land. Dr. Garnett was the Chief Geologist to Associated Mines (Malaya) Ltd. which controls a number of dredging companies in Kuala Lumpur area and the Kinta Valley when this accident took place. Both Dr. Garnett and Dr. Fitch have put up their reports as to how the bund in this case collapsed and they have given evidence to the same effect.

D Dr. Garnett's opinion is that the events on the date of the accident were consistent with the bund having collapsed by the action of an underground spring which emerged beneath the bund without any prior warning because of the very heavy rainfall in the surrounding hills. His reasons for this opinion are as follows. If a spring emerges from the bedrock and goes through alluvium or sand and overlying water, one would observe a boiling of water on the surface of the overlying water. A spring emerging through sand would create a quicksand. The head of water in the tube wells sunk by Mr. Daniell in the area indicated that a spring existed at the site of the tube wells.

F The substance of the evidence of Dr. Garnett in his own words is as follows:

"The aperture through which the spring came may not have existed before. In my experience I have never known a head of water to form at surface level under artesian conditions in the manner in which it occurred in this case. If a spring was going to form in this area, I would expect it to emerge at the base of the foothills. It is not usual for a spring to emerge under artesian conditions in the middle of a valley. The likelihood of that happening is extremely rare.... The appearance of the spring in the area for the first time would be an unprecedented phenomena. Nevertheless I have come to the conclusion that this is what did happen. I base my conclusions on a knowledge of what can occur on a limestone bedrock. Unprecedented in this area, but not unprecedented in other areas. I do not say that this happened here. I put it forward as the only explanation I can see for what happened. If weakness of the bund was not the cause of the collapse, this would be the only other explanation.... I had the evidence of the tube wells to go on. The only evidence he (Mr. Daniell) found was in the P.1 area and not in the area where the boil is alleged to have occurred. The tube wells in which Mr. Daniell found the springs were 100 feet from the centre of the bund.... The water emerged on surface in P.2 and travelled through the alluvium and sand mat to that point. It chose the path of least resistance. The path of least resistance was down towards P.2."

I now come to the evidence of Dr. Fitch

whose main conclusion is that the collapse of the bund was caused by a spring emerging from below the downstream slope of the bund and due to water reaching the site through underground channels under pressure and from a distance source. In his report he has referred to a tunnel of limestone extending up into the Sungei Kera-yong Valley. He says that he came to discover it because he was quite certain that water had come to the site of the bund through the limestone under pressure and that therefore there must be a point of entry for the water into the limestone at a significantly higher level than the bedrock below the bund.

The essence of Dr. Fitch's evidence, in his own words, is as follows:

"In this case there was boiling on the downstream side of the bund, quicksand in the breach after the collapse and an artesian flow on the upstream side of the bund. I am sure those events were not related to different causes. All the evidence is consistent with the water having come from one place in the bedrock, I think at a point upstream of the bund in the area of the tube wells, possibly within the area of the sand mat. It was unable to come out in P.1 while the water was in P.1 because of the weight of water in P.1, a layer of slimes on the floor of P.1 and the weight of the bund itself. It forced itself in P.2 and appeared as a boil. It took the line of least resistance. The quicksand was like the spring due to a rising column of water. When the bund and the water in P.1 had gone, the spring moved towards a vertical course and before it reached the area of the tube well it rose within the breach and caused the quicksand. The quicksand was caused after the collapse when it was seen. Initially the quicksand was where the boil appeared. It was below the water, so that no one could see. The quicksand moved nearer to the point of origin as the pressure decreased."

As regards the emergence of the spring and the consequent appearance of boil on the surface of water, Dr. Fitch says as follows:

"The evidence is that there was an exit from bedrock below the upstream part of the sand mat. This did not exist or was blocked just before the accident. The heavy rainfall in the hills two days before the accident would raise the water table in the mine dumps in Ulu Kerayong. If the rainfall was exceptional, the rise would be exceptional. The channels in the bedrock will be filled with water under pressure. When water broke out, it would be a violent process....It is very unusual to have an artesian flow in an alluvial valley at an appreciable distance from the hills. In this case the distance was appreciable. I have never seen an artesian flow in this kind of situation before....The boil, the quicksand and the tube wells had one main cause. They had a number of common features which made me certain that they had a common cause. The common features were that they all occurred within a very small area, that they occurred within a short period of time, that they occurred in succession, that they occurred in the succession that would be expected and that they were all due to a rising column of water."

Now that I have dealt with the evidence in this case, the bulk of which is the evidence of scientific witnesses, before stating my conclusions I must say that essentially the case is very simple. The claim is based on the ground of escape of water from the defendants' property. Neither

A escape nor the consequent damage, including the death by drowning of the deceased, is denied. On the facts there is not very much more that the plaintiff could have possibly proved and it is his case that the accident has certain legal consequences. The nature of these consequences, of course, must depend upon the cause of failure of the bund. The defendants have sought to prove that the collapse was due not to piping or internal erosion from P.1 to P.2 either through the bund or through the sand mat but to the sudden emergence of a spring from bedrock beneath the bund which was an act of God.

B  
C It is quite clear from the evidence that there is a limestone bedrock beneath the defendants' lands. It has also been shown to be a scientific fact that limestone bedrock will normally have channels of water running through it and that if these channels get blocked the water may force itself out through the limestone and appear in the form of a spring. The whole idea of an artesian flow from a spring causing the collapse of the bund originates with the evidence of Mr. Waugh that when he visited the site he fell into a quicksand. This quicksand, it is said, was formed by an upward flow of water after P.1 had been drained out. However, no further investigations were made into the presence of this quicksand. Mr. Waugh found no simmering of water over the area of the quicksand. He calls it quicksand presumably because he sank into it up to his waist, but the mere presence of sand into which a person sinks is not necessarily conclusive that the quicksand condition was caused by an upward flow of water. In this connection Terzaghi in his book on "Soil Mechanics in Engineering Practice" says at page 100:

"In everyday language the term *quicksand* indicates a natural mass of saturated sand into which a person or object sinks. The lack of bearing power may be due to the seepage pressure of water percolating through the sand in an upward direction. On the other hand it may be due to inherent instability of the structure of the sand, unaided by seepage pressure. Quicksand conditions produced by seepage pressure are frequently encountered at the bottom of excavations in sand below the water table."

G  
H The evidence is that P.1 contained very large quantities of water and that all this water flowed through the breached portion of the sand bund or sand mat. This flow must have caused excavations in the breached area which must have got filled with loose sand. Such loose sand would hardly support any weight. It was therefore not surprising that Mr. Waugh sank into it. If the quicksand was on top of the passage created by the artesian flow, one would have expected to see further evidence of such flow whenever there was any rain. No observation for such a flow was made. I therefore cannot accept the presence of the quicksand as conclusive evidence of the existence of a spring underneath.

Another reason suggested for the presence of the underground spring is the boil of water which Mr. Mayne saw. Dr. Fitch was most emphatic that the boil of water was caused by a spring. His evidence on this point is as follows:

"The spring appeared directly before the collapse. I know that from the evidence of Mr. Mayne. The spring appeared just when Mr. Mayne saw it. The water came out with sufficient velocity to make a 6-inch boil. I think that the hole in the bedrock took place below P.1. The flow of water was sufficiently strong to force its way through the sand mat and then appear as a 6-inch boil in P.2.... The water, after coming out of the spring, travelled 150 feet to the other side of the bund before it appeared in the form of a boil. It would not be more likely to rise vertically and appear in P.1 itself because of the presence of a layer of slimes on the sand mat in P.1 and the depth of water retained by the bund and also the weight of the bund itself. The weakest area was immediately below the downstream side of the bund."

If that part of the evidence of Mr. Fitch is to be accepted at its face value, how is one to account for the fact that the bund had started slipping more than 1½ hours before the emergence of the so-called spring? Mr. Mayne saw at 9.30 a.m. that a part of the bund on the downstream side had slipped. He saw further slipping when he was in the dredge and a third slip took place just before he saw the boil at 11 a.m. It has never been suggested at any stage that it took more than 1½ hours for the spring to travel from the bedrock to the downstream side of the bund. The evidence seems to be that the spring was of such force that it gushed out like a fire hose immediately after it burst through the limestone. In the circumstances I am of the opinion, and I find it as a fact, that the boil of water in P.2 was not caused by the emergence of any spring. I find support for my conclusion in the following passage in "Engineering for Dams" Vol. I by *Justin* at page 708:

"Vertical piping sometimes occurs at the downstream toe of an earth dam or levee. Usually in such cases there is a layer of material in the foundation which is much more pervious than the strata at the surface of the foundation, and as the head increases the hydrostatic pressure in this layer increases until the water lifts the overlying strata, forming boils on the surface of the ground."

As regards the artesian flow from the tube wells, the further fact on which both Dr. Garnett and Dr. Fitch rely for their conclusions, it is to be observed that, as stated by Dr. Garnett in his evidence, the first well was sunk as near as possible to the bund where the boiling of water occurred in P.2. That did not produce evidence of a spring. In fact many tube wells were sunk before one with water was found. The tube wells from which Mr. Daniell found artesian flow were 100 feet away from the centre of the bund. It is also to be observed that the whole of the area from which water flowed in artesian condition through the tube wells had been mined. Boring had also taken place in the area. It is

therefore not inconceivable that there were apertures in the limestone bedrock all along. Indeed it would be correct to say that there must have been numerous underground springs which, of course, could not appear on surface in the middle of a valley until tube wells were sunk over them or near them so as to make it possible for the water to gush out through the tube. This is clear from what Dr. Garnett himself said in his evidence, namely, that if in a valley we have no visible springs on the ground surface and we sink a drill hole and water gushes out of that drill hole, we call it an artesian flow. This is further borne out by the following evidence of Dr. Garnett:

"The only evidence indicating that the springs were new ones was the fact that they had not been detected before. If the tube wells had not been sunk, no water was visible at the surface."

Dr. Fitch also said in his evidence that drilling would damage bedrock and would itself lead to the formation of a spring.

For the reasons I have stated I have come to the conclusion that the failure of the bund was not due to the sudden emergence of an underground spring or springs beneath the bund just before the accident. That leaves piping due to sub-surface erosion as the only other probable cause of the failure.

Mr. Vail's contention is that piping could not have occurred from P.1 to P.2 because of the width of the bund at its junction with the mat and because of the low hydraulic gradient between P.1 and P.2. It is clear from his evidence, however, that the weakest part of the bund was the mat beneath the bund which was much more pervious and highly laminated. He has admitted that permeability of the sand mat was considerably higher than the permeability of the sand bund. According to him the most critical conditions for piping would be immediately beneath the bund, within 4 feet. But he has argued that if the bund was going to collapse because of piping from P.1 to P.2, that would have happened when the differential of water in the two pools was 9½ feet. In saying that, in my opinion, Mr. Vail was trying to have it both ways. His contention all along was that the bund was a substantial bund by reason of its width at the base. If that was so, sub-surface internal erosion could not possibly have caused the bund to collapse within a few days. In this connection *Terzaghi* at page 507 says that the head required to produce failure of a dam by piping due to sub-surface erosion can be very much smaller than the critical head for piping by heave. Starting at the bottom of page 506, *Terzaghi* states as follows:

"The frequency of piping failures due to sub-surface erosion is obviously due to the fact that all natural soil strata are more or less nonhomogeneous. When water

percolates through such strata, it follows the most permeable zones, and it leaves the ground in the form of springs. If the discharge of a spring is great enough, and the soil conditions favour underground erosion, the spring may gradually create a tunnel by cutting backward along a line of maximum hydraulic gradient. As soon as the intake end of this natural tunnel arrives near the bottom of the reservoir, the water breaks into the tunnel, and the dam fails by piping."

*Terzaghi* also states at pages 230 and 507 that the mechanics of piping by sub-soil erosion defy theoretical approach and that the destruction of dams by piping is usually so complete that the sequence of events can seldom be reconstructed. Mr. Vail agreed with this opinion expressly by *Terzaghi*.

On the evidence before me I have formed the opinion that this was a case of progressive seepage through the sand mat followed by progressive piping which led ultimately to the collapse of the bund. The boil of water seen by Mr. Mayne was nothing more than vertical piping from springs on the downstream side of the bund. The evidence indicates that there must have been seepage through the sand mat from the time when P.1 had a sufficiently large quantity of water. This seepage gradually led to piping. The flow of water through the sand mat beneath the bund continued to increase. It is bound to have increased still further when the differential in the two pools was 9½ feet over a considerable period. Matters came to a head when large quantities of water flowed into P.1 because of the heavy rainfall in the surrounding hills on 7th October, 1963. When Mr. MacLean found seepage conditions in the spillway 17 bund on 8th October, 1963 he found the level of water in P.2 very high, although the level of water in P.1, according to him, had not increased appreciably. As the only intake for P.2 was from P.1 the rise of water in P.2 was caused by the flow of water from P.1 over spillway 13 and by piping through the sand mat. Even Mr. Mayne on his visit to spillway 17 bund on the morning of 9th October, 1963 found that the level of water in P.2 was the highest he had ever seen. This, in my opinion, was the clearest indication that water was getting from P.1 into P.2 on account of sub-surface erosion through the sand mat beneath the bund. It was this sub-surface internal erosion which caused the slipping of sand which Mr. Mayne first observed. Further slipping continued until the appearance of the boil of water followed by the collapse of the bund. Mr. Mayne did not remain there to see the final collapse. It is therefore not possible to say whether there was any sinking of the bund just before its collapse. He did not have a look on the upstream side of the bund so that it is not possible to say whether or not the boil on the downstream side had a corresponding vortex on the upstream. It is also not possible to say whether the breach

A made in the outer bund of P.2 hastened the collapse of bund A by drawdown. However, taking the evidence as a whole there can be no doubt that the bund failed because of sub-surface erosion and I accordingly make a finding of fact to that effect.

B As I have stated above, the facts of this case are simple. The defendants were using P.1 as a water reservoir. This water reservoir was above ground level. It contained very large quantities of water. There is no evidence as to the exact depth of the water in P.1, but Mr. MacLean said that it was at least 13 feet. In any event there was sufficient depth of water to allow water to be taken from there to the dredge paddock through a pipe line by gravitation. Another pipe line was being installed at the time of the accident in order to take more water into the dredge paddock. There was heavy rainfall in the surrounding hills on the 7th of October. C followed by more rainfall on 8th October. Seepage conditions were seen on the outer bund of P.2 on the evening of 8th October and the morning of 9th October, 1963. Water was seen flowing through the leaks carrying grains of sand. Bund A started to fail before 9.30 a.m. on 9th October, 1963. The final collapse came soon after 11 a.m. The artificial breach on the outer bund of P.2 is likely to have hastened the collapse to some extent.

The plaintiff's claim is based on negligence, nuisance and absolute liability or the rule in *Rylands v. Fletcher*.<sup>(1)</sup> F The plea of breach of statutory duty was raised but finally abandoned.

As far as negligence is concerned, the plaintiff would appear to rely almost entirely on the doctrine of *res ipsa loquitur*. But, apart from the *res* there is no other evidence of negligence and I do not think the *res* itself makes out negligence. G Apart from a rather halfhearted plea that the defendants should have given warning of the imminence of the flooding condition, the method of constructing the bund can hardly be relied on as some sort of negligence on the part of the defendants. It has been contended by the defendants that no one is bound to foresee every conceivable eventuality. With that as a general statement I agree. I also agree that if the possibility of danger emerging is reasonably apparent, then not to take precautions is negligence, but not otherwise. In my opinion the evidence does not make out negligence.

I Nuisance also, in my opinion, cannot be seriously put forward as a ground for liability, as there is no allegation of any wilful act. If collapse of the bund is to be regarded as a nuisance, the answer is that the defendants had no knowledge that it was going to collapse. As stated by *Clerk and Lindsell* on Torts, 12th Edition, para. 1232:

"As no one is liable for nuisance unless he either created it or continued it after knowledge or means of knowledge, it follows that it is a defence to prove ignorance of the facts constituting the nuisance, unless that ignorance is due to the omission to use reasonable care to discover the facts."

Moreover, nuisance connotes something continuing or recurring. In this connection Denning L.J. stated as follows in the case of *Attorney-General v. P. Y. A. Quarries Ltd.*<sup>(2)</sup>:

"I quite agree that a private nuisance always involves some degree of repetition or continuance. An isolated act which is over and done with, once and for all, may give rise to an action for negligence or an action under the rule in *Rylands v. Fletcher*<sup>(1)</sup> but not an action for nuisance."

That brings me to the rule in *Rylands v. Fletcher* as the remaining basis for liability. The defendants in that case constructed a reservoir upon their land, in order to supply water to their mill, and upon the site chosen for this purpose there was a disused and filled-up shaft of an old coal mine, the passages of which communicated with the adjoining mine of the plaintiff. Through the negligence of the contractors or engineers by whom the work was done (and who were not the servants of the defendants) this fact was not discovered, and the danger caused by it was not guarded against. When the reservoir was filled, the water escaped down the shaft and thence into the plaintiff's mine, which it flooded. It was held by the Exchequer Chamber and by the House of Lords that the defendants were liable, although guilty of no negligence either by themselves or by their servants. Blackburn J., in delivering the judgment of the Exchequer Chamber said:

"The question of law therefore arises, what is the obligation which the law casts on a person who, like the defendants, lawfully brings on his land something which, though harmless while it remains there, will naturally do mischief if it escapes out of his land? It is agreed on all hands that he must take care to keep in that which he has brought on the land and keeps there, in order that it may not escape and damage his neighbours: but the question arises whether the duty which the law casts upon him under such circumstances is an absolute duty to keep it at his peril or is, as the majority of the Court of Exchequer have thought, merely a duty to take all reasonable and prudent precautions in order to keep it in, but no more.

We think that the true rule of law is that the person who for his own purposes brings on his lands and collects and keeps there anything likely to do mischief if it escapes, must keep it in at his peril, and if he does not do so is *prima facie* answerable for all the damage which is the natural consequence of its escape. He can excuse himself by showing that the escape was owing to the plaintiff's default; or, perhaps, that the escape was the consequence of *vis major* or the act of God; but as nothing of the sort exists here, it is unnecessary to inquire what excuse would be sufficient."

The rule of law enunciated by Blackburn J. was approved in the House of Lords in the following words of Lord Cairns:

"If a person brings or accumulates on his land anything which, if it should escape, may cause damage to

his neighbours, he does so at his peril. If it does escape and cause damage, he is responsible, however careful he may have been, and whatever precautions he may have taken to prevent the damage."

Lord Cairns in addition to approving the reasons for the decision given by Blackburn J. also founded his judgment on the ground that the defendants had made a non-natural use of their land which he described as "introducing into the close that which, in its natural condition, was not in or upon it". His Lordship pointed out that the defendants had for their own purposes made "a non-natural use" of their land, by "collecting water in quantities and in a manner not the result of any work or operation on or under the land." In illustration, he cited two mining cases in one of which the defendant's normal operations resulted in flooding of a neighbouring mine through mere gravitation (*Smith v. Kenrick*<sup>(3)</sup>), while in the other flooding was caused by the pumping of water to a higher level from which it flowed into the adjoining mine (*Baird v. Williamson*<sup>(4)</sup>). The first was a natural use of mining land and the second was not, and in consequence the defendant was held not liable in the former, but liable in the latter case.

It is to be observed that the basis of liability under the rule is the bringing upon one's land of something which is likely to cause mischief if it should escape and whether this amounts to non-natural use of the land. As regards non-natural use, Lord Moulton in *Rickards v. Lothian*<sup>(5)</sup> said:

"It must be some special use bringing with it increased danger to others, and must not merely be an ordinary use of the land or such a use as is proper for the general benefit of the community."

In *Read v. Lyons & Co. Ltd.*<sup>(6)</sup> it was decided by the House of Lords that there is no liability under the rule unless there is an "escape" of the dangerous substance from land under the control of the defendant to a place outside his occupation.

In the present case there can be no arguments about escape. As regards use of the land, I do not think that the facts here are any different from the facts in the case of *Rylands v. Fletcher*<sup>(1)</sup> itself. In that case the defendants constructed the reservoir in order to supply water to their mill. In the present case the defendants constructed the water reservoir to supply the dredge paddock. The water reservoir in this case was above ground level. According to Mr. Curtis, who as Senior Inspector of Mines must be presumed to know all about the normal mining practice in this country, it was not common to have water reservoirs above ground level for the purpose of supplying water to a mine. Indeed he went so far as to say that he had known of only one other instance where a reservoir above ground level was used and that had failed. This evidence of Mr. Curtis stands unchallenged.

Moreover, this reservoir was in the neighbourhood of an area which was thickly populated. That fact alone, in my opinion, is a sufficient ground for holding that this was a special use of the land bringing with it increased danger to others. The defendants built the reservoir in order to save the cost of power for pumping water from a sub-surface pool. I agree that there was nothing criminal about that, but it cast upon the defendants the duty of keeping the water confined within their bunds. In other words in doing what they did they were acting at their own peril.

It has been suggested that having a series of step ponds was a part of their mining scheme in order to prevent erosion, but it is clear from the evidence that they did not require a big reservoir for that purpose. All that was required was a certain height of water not exceeding 3 feet. Had the pond been confined to that depth, this accident would in all probability have never happened. Notwithstanding all that has been urged on behalf of the defendants, I have come to the conclusion that this was a non-natural use of the land so that the case falls fairly and squarely within the rule in *Rylands v. Fletcher*<sup>(1)</sup> which is a part of the law of this country by virtue of section 3 of the Civil Law Ordinance, 1956.

Blackburn J. recognised the act of God as a possible defence to an action under the rule in *Rylands v. Fletcher*.<sup>(1)</sup> An act of God, which is equivalent to *damnum fatale* in Scottish law, was defined by Lord Westbury in *Tennent v. Earl of Glasgow*<sup>(7)</sup> as "circumstances which no human foresight can provide against, and of which human prudence is not bound to recognise the possibility, and which when they do occur, therefore, are calamities that do not involve the obligation of paying for the consequences that may result from them." This definition was approved by the House of Lords in *Greenock Corpn. v. Caledonian Railway*<sup>(8)</sup> in which it was held that a rainfall of extraordinary violence is not an act of God. Lord Dunedin said in that case:

"The appellants argue that...if they can show that this rainfall was much in excess of what had been previously observed in Greenock that is enough. I do not think that you can rightly confine your view to Greenock alone. No one can say that such rainfall was unprecedented in Scotland; and I think the appellants were bound to consider that some day Greenock might be subjected to the same rainfall as other places in Scotland had been subjected to."

In the earlier case of *Nichols v. Marsland*<sup>(9)</sup> extraordinary rainfall was held to be an act of God on a finding by the jury, though there has been some doubt whether that finding was correct. In a tropical country such as Malaya a heavy shower can certainly not be held to be an act of God. Rainfall has not been pleaded as an

act of God in this case, but I have dealt with it because of the evidence that there was heavy rainfall on the 7th of October.

A large number of other authorities were referred to me in connection with liability under the doctrine of *Rylands v. Fletcher*.<sup>(1)</sup> I have not considered it necessary to deal with them because, as was pointed out by Lord Porter in *Read v. J. Lyons & Co. Ltd.*,<sup>(6)</sup>

"each seems to be a question of fact subject to a ruling of the judge as to whether the particular object can be dangerous or the particular use can be non-natural, and in deciding this question I think that all the circumstances of the time and place and practice of mankind must be taken into consideration so that what might be regarded as dangerous or non-natural may vary according to those circumstances."

As I have stated above, in my opinion this case comes within the rule in *Rylands v. Fletcher*.<sup>(1)</sup> I therefore hold that the defendants are liable in damages.

It was urged upon me that in view of what Lord Macmillan said in *Read v. J. Lyons & Co. Ltd.*<sup>(6)</sup> damages for personal injuries cannot be recovered under the doctrine of *Rylands v. Fletcher*.<sup>(1)</sup> But, as *Charlesworth* on Negligence (4th edition) says at page 523, "there is neither principle nor authority for holding that there can be liability for one kind of damage, namely, to property, and yet no liability for another, namely, for personal injuries, caused by the same wrong." Damages for personal injuries under the principle of *Rylands v. Fletcher*<sup>(1)</sup> were awarded in *Miles v. Forest Rock Granite Co., Ltd.*,<sup>(10)</sup> *Shiffman v. Order of St. John*<sup>(11)</sup> and *Hale v. Jennings Bros.*<sup>(12)</sup>

Coming to the question of damages, on the evidence before me, about which there is very little dispute, I would assess loss of expectation of life at \$3,000 of which a sum of \$1,350 will not merge with the amount to be awarded for loss of dependence. Bearing that in mind, I allow general damages in the sum of \$18,000. As regards special damages, in view of the extra rites which had to be performed by reason of the deceased's death by drowning, I allow \$1,500 for funeral expenses, and I allow a sum of \$13,960.60 in respect of loss of pigs, fowls and cash and damage to house, pigsty and motor car.

There will be judgment for the plaintiff in the sum of \$33,460.60 with interest thereon at 6% from the date of filing of the action until today and thereafter on the aggregate at the same rate. Defendants to pay the costs of the action. I give a certificate for two counsel. I also make an order that the plaintiff be allowed reasonable expenses for the evidence of Dr. Thambu Mylvaganam and Mr. Curtis as experts.

*Judgment for the plaintiff.*

Solicitors: *Murphy & Dunbar; Skrine & Co.*